In the Claims:

The claims are as follows:

1. (Original) An isolation structure, comprising:

(a) a semiconductor substrate; and

(b) an electric isolation region embedded in the semiconductor substrate, wherein the electric isolation region comprises (i) a bubble-implanted semiconductor region and (ii) an electrically insulating cap region on top of the bubble-implanted semiconductor region.

2. (Original) The isolation structure of claim 1, wherein a top surface of the electrically insulating cap region is essentially at a same level as a top surface of the substrate.

3. (Original) The isolation structure of claim 1, wherein the bubble-implanted semiconductor region comprises gas bubbles implanted in a semiconductor material, and wherein the gas bubbles comprise a noble gas.

4. (Original) The isolation structure of claim 3, wherein the gas bubbles further comprise an oxide material at their edges.

5. (Original) The isolation structure of claim 4, wherein the oxide material comprises silicon dioxide.

6. (Original) The isolation structure of claim 1, wherein the electrically insulating cap region

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comprises silicon dioxide.

7. (Original) A method for forming an isolation structure, the method comprising the steps of:

(a) providing a semiconductor substrate;

(b) implanting gas bubbles into a semiconductor region of the substrate so as to form a bubble-implanted semiconductor region in the substrate; and

(c) forming an electrically insulating cap region on top of the bubble-implanted semiconductor region.

8. (Original) The method of claim 7, further comprising the step of, after the step (b) is performed but before the step (c) is performed, subjecting the bubble-implanted semiconductor region to a heat cycle such that sizes of the implanted gas bubbles in the bubble-implanted semiconductor region will reach a pre-specified average size after the heat cycle and other ensuing heat fabrication steps.

9. (Original) The method of claim 7, wherein the step of implanting the gas bubbles comprises the steps of:

forming a hard mask layer on top of the semiconductor substrate;

creating an opening in the hard mask layer such that the substrate is exposed to the atmosphere via the opening; and

implanting the gas bubbles into the semiconductor region of the substrate via the opening so as to form the bubble-implanted semiconductor region.

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10. (Original) The method of claim 9, further comprising the step of stripping the hard mask layer after the step of forming the electrically insulating cap region.

11. (Original) The method of claim 10, wherein the step of stripping the hard mask layer comprises the use of chemical mechanical polishing.

12. (Original) The method of claim 7, further comprising the step of, after step (a) is performed but before step (b) is performed, etching into the substrate where the gas bubbles are to be implanted such that when the electrically insulating cap region having a pre-specified thickness is formed as a result of the step (c), a top surface of the electrically insulating cap region is essentially at a same level as a top surface of the substrate.

13. (Original) The method of claim 12, wherein the step of forming the electrically insulating cap region is performed such that the top surface of the electrically insulating cap region is essentially at the same level as the top surface of the substrate.

14. (Original) The method of claim 7, wherein the step of implanting the gas bubbles involves the use of an implanting gas which comprises a noble gas.

15. (Original) The method of claim 14,

wherein the implanting gas further comprises oxygen such that the resulting gas bubbles in the bubble-implanted semiconductor region comprise oxygen, and

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wherein the step of forming the electrically insulating cap region comprises the step of subjecting the entire isolation structure to a temperature level such that the oxygen in the gas bubbles in the bubble-implanted semiconductor region reacts with a semiconductor material of the substrate to form a material which essentially prevents the gas bubbles from increasing in size under the temperature level.

16. (Original) The method of claim 7, wherein the step of forming the electrically insulating cap region comprises the step of thermally oxidizing a top surface of the bubble-implanted semiconductor region.

17. (Original) The method of claim 16, wherein the step of thermally oxidizing the top surface of the bubble-implanted semiconductor region is performed until a top surface of the resulting electrically insulating cap region is essentially at a same level as a top surface of the substrate.

18. (Original) The method of claim 7, wherein the gas bubbles comprise a noble gas.

19. (Original) The method of claim 7, wherein the electrically insulating cap region comprises silicon dioxide.

20. (Original) A method for forming an isolation structure, the method comprising the steps of:

(a) providing a semiconductor substrate;

(b) forming a hard mask layer on top of the semiconductor substrate;

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(c) creating an opening in the hard mask layer such that a top surface of the substrate is exposed to the atmosphere via the opening;

(d) etching into the substrate via the opening;

(e) implanting gas bubbles into a semiconductor region of the substrate via the opening so as to form a bubble-implanted semiconductor region in the substrate; and

(f) forming an electrically insulating cap region on top of the bubble-implanted semiconductor region such that a top surface of the electrically insulating cap region is essentially at a same level as a top surface of the substrate.

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